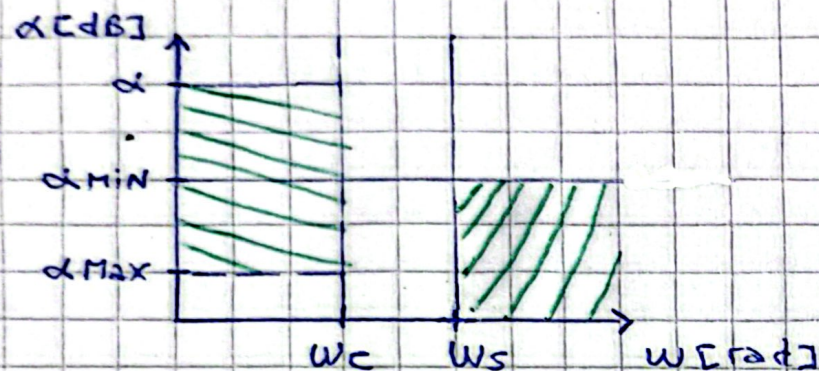


1) Plantilla normalizada



$$\alpha_{\text{MAX}} = 1 \text{ dB} ; \alpha_{\text{MIN}} = 12 \text{ dB}$$

$$F_c = 1500 \text{ Hz} \Rightarrow \omega_c = 1 \text{ rad/s}$$

$$F_s = 3000 \text{ Hz} \Rightarrow \omega_s = 2 \text{ rad/s}$$

$$|d|^2 = 1 + \epsilon^2 \omega^{2n} \Rightarrow \alpha_{\text{dB}} = 10 \log(1 + \epsilon^2 \omega^{2n})$$

$$\alpha_{\text{MAX}} = \alpha(\omega = \omega_c) = 10 \log(1 + \epsilon^2) \Rightarrow \epsilon^2 = 10^{\frac{\alpha_{\text{MAX}}}{10}} - 1 //$$

$$\epsilon^2 = 10^{\frac{1 \text{ dB}}{10}} - 1 = 0,2589 \Rightarrow \epsilon = \sqrt{0,2589} \Rightarrow \boxed{\epsilon = 0,5089}$$

$$\alpha_{\text{MIN}} = \alpha(\omega = \omega_s) = 10 \log(1 + \epsilon^2 \omega_s^{2n}) ; n \in \mathbb{N} = 1, 2, \dots / \alpha_n \gg \alpha_{\text{MIN}} \rightarrow n //$$

$$\alpha_2 = 10 \log(1 + 0,2589 \cdot 2^4) \Rightarrow \alpha_2 = 7,11 \text{ dB} < \alpha_{\text{MIN}} \Rightarrow n = 2 \text{ X}$$

$$\alpha_3 = 10 \log(1 + 0,2589 \cdot 2^6) \Rightarrow \alpha_3 = 12,45 \text{ dB} > \alpha_{\text{MIN}} \Rightarrow \boxed{n = 3}$$